REMARKS

Responsive to the Office Action mailed on October 19, 2005 in the above-referenced application, Applicant respectfully requests amendment of the above-identified application in the manner identified above and that the patent be granted in view of the arguments presented. No new matter has been added by this amendment.

Present Status of Application

Claims 1-20 are pending. Claims 1 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Niitsu (US 5,137,839, hereinafter "Niitsu"). Claims 1, 2, 4, 7, 8, 9, 11, 14 and 16-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Tran et al (US 5,534,445, hereinafter "Tran"). Claims 6, 8, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niitsu. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tran in view of Yamazaki et al (US 5,840,600, hereinafter "Yamazaki"). Claim 20 is rejected under 35 U.S.C. 102(b) as being anticipated by Yamaguchi et al (US 2001-0023091 A1, hereinafter "Yamaguchi").

In this paper, claims 1, 8 and 20 are amended to recite a step of annealing using a fluorine-containing gas, a chlorine-containing gas, an oxygen-containing gas, or mixtures thereof to passivate the polysilicon layer in a single step. Support for the amendment can be found on page 2, lines 21-27 and throughout the specification.

Reconsideration of this application is respectfully requested in light of the amendments and the remarks contained below.

Rejections Under 35 U.S.C. 102

Claims 1 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Niitsu. Claims 1, 2, 4, 7, 8, 9, 11, 14 and 16-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Tran. Claim 20 is rejected under 35 U.S.C. 102(b) as being anticipated by Yamaguchi. To the extent that the grounds of the rejections may be applied to the claims now pending in this application, they are respectfully traversed.

To anticipate a claim, a reference must teach every element of the claim. In this regard, the Federal Circuit has held:

> "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).
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> "The ***identical invention*** must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). [Emphasis added]

Niitsu

Claims 1 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Niitsu. In the office action dated October 19, 2005, the Examiner asserts:

> Applicant has further argued that Niitsu does not teach or suggest that this is carried out in one step. This argument is respectfully found to be not persuasive because the claim does not recite that this is carried out in one step ...

As amended, claim 1 recites a process for passivating polysilicon, comprising the following steps of forming a polysilicon layer; and annealing using a fluorine-containing gas, a chlorine-containing gas, an oxygen-containing gas, or mixtures thereof to passivate the polysilicon layer ***in a single step***.

To the contrary, Niitsu teaches:

> After the insulator film 13 is removed, as shown in FIG. 7, an atom 15 combined with a dangling bond of silicon, for example, ***one or some of fluorine(F), fluoride, hydrogen(H) and carbon(C) is ion-implanted into the N-type polysilicon layer 11.*** As illustrated in FIG. 8, the polysilicon layer is patterned to form an emitter

> leading electrode. The resultant structure is covered with an interlayer insulation film 16 ***and then undergoes a thermal treatment.***" [Emphasis added]

See column 3, lines 19-27 and FIGS. 7-8 of Niitsu.

> "The feature of the present invention resides in that ***an atom is introduced into a polysilicon layer*** for forming an emitter leading electrode, ***then the atom is combined with a silicon atom*** having a dangling bond existing on the crystal grain interface of polysilicon ***by thermal treatment***, and the dangling bond of the silicon atom can thus be passivated." [Emphasis added]

See column 3, lines 61-67 of Niitsu.

In other words, the process for passivating polysilicon recited in Niitsu comprises two steps: ***first***, one or some of fluorine (F), fluoride, hydrogen (H) and carbon (C) atoms are introduced into the polysilicon; and ***second*** a thermal treatment process is performed to combine the atoms with silicon having dangling bonds existing on the crystal interface of the polysilicon to passivate the dangling bond of the silicon atom.

Accordingly, it is evident that the passivation method in Niitsu differs from the passivation method of amended claim 1 since Niitsu does not teach or suggest annealing using a fluorine-containing gas, a chlorine-containing gas, an oxygen-containing gas, or mixtures thereof to passivate the polysilicon layer ***in a single step***.

For at least the reasons described above, it is Applicant's belief that Niitsu fails to teach or suggest all the limitations of claim 1. Applicant therefore respectfully requests that the rejection of claim 1 be withdrawn over Niitsu and the claim passed to issue. Insofar as claim 5 depends from claim 1 either directly or indirectly, and therefore incorporates all of the limitations of claim 1, it is Applicant's belief that this claim is also in condition for allowance.

Tran

Claims 1, 2, 4, 7, 8, 9, 11, 14 and 16-19 are rejected under 35 U.S.C. 102(b) as being unpatentable by Tran. In the office action dated October 19, 2005, the Examiner asserts:

> This argument is respectfully found not to be persuasive because Tran discloses nitrogen (col. 4, lines 45-51), and the claim requires a nitrogen containing gas, so that this limitation is satisfied.

Tran teaches hydrogen passivation comprising a step of annealing with a hydrogen gas or a mixture of hydrogen and nitrogen or an inert gas. See col. 4, lines 45-51 of Tran. Tran does not teach or suggest a step of annealing ***using a fluorine-containing gas, a chlorine-containing gas, an oxygen-containing gas, or mixtures thereof*** to passivate the polysilicon layer ***in a single step***, as recited in amended claims 1 and 8.

For at least the reasons described above, it is Applicant's belief that Tran fails to teach or suggest all the limitations of claims 1 and 8. Applicant therefore respectfully requests that the rejection of claims 1 and 8 over Tran be withdrawn and the claims passed to issue. Insofar as claims 2, 4, and 7 depend from amended claim 1, and claims 9, 11, 14, and 16-19 depend from amended claim 8, it is Applicant's belief that these claims are also in condition for allowance.

Yamaguchi

Claims 20 is rejected under 35 U.S.C. 102(b) as being anticipated by Yamaguchi. In the rejection, the Examiner asserts that Yamaguchi teaches the introduction of fluorine or chlorine into the source and drain regions in FIG. 3C and paragraphs 0036 and 0081.

As disclosed by Yamaguchi:

> [0084] Using an apparatus of FIG. 5, ***hydrogen ion implantation*** is performed at an acceleration voltage of 40 keV and a dose of 2.times.10.sup.16 cm.sup.-2. (FIG. 3C) [Emphasis added]

> [0085] ***Annealing by irradiation with a laser light is performed to activate P ions introduced in FIGS. 3B and 3C and to recover the damage caused by ion implantation in FIGS. 3B and 3C***, by using KrF excimer laser, with one to several shots at a power density of 100-300 mJ/cm.sup.2. The effect of laser irradiation will be enhanced by simultaneous heating at about 300.degree. C. This annealing may be replaced by the above mentioned RTA with infrared ray or heating. (FIG. 3D). [Emphasis added]

It is evident that Yamaguchi teaches ***two steps,*** namely a first step that introduces hydrogen or fluorine atoms into the polysilicon and then a second step in which an annealing process is performed. Therefore, Yamaguchi does not teach or suggest annealing using a fluorine-containing gas, a chlorine-containing gas, an oxygen-containing gas, or mixtures thereof to passivate the polysilicon layer ***in a single step*** as recited in amended claim 20.

Applicant further notes that the rejection appears to rely upon a combination of Yamaguchi and Niitsu, and is therefore not a proper anticipation rejection.

For at least the reasons described above, it is Applicant's belief that Yamaguchi fails to teach or suggest all the limitations of claim 20. Applicant therefore respectfully requests that the rejection of claim 20 over Yamaguchi be withdrawn and the claim passed to issue.

Rejections Under 35 U.S.C. 103(a)

Claims 6, 8, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable by Niitsu. Claims 3 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tran in view of Yamazaki.

MPEP 2142 reads in part:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined)

> must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

In connection with the third criteria, MPEP 2143.03 goes on the state:

> To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Niitsu

Claim 6 is believed to be allowable by virtue of its dependency from claim 1.

With reference to claim 8, the Examiner asserts:

> Niitsu does not teach the recited gases nor the formation of a thin film transistor. It would be obvious to one of ordinary skill in the art at the time of the invention to have used fluorine as the fluorine gas source and to use the process in the formation of thin film because Niitsu teaches that vapor phase may be used and the dangling bonds of polysilicon are passivated.

However, as noted above, the process for passivating polysilicon recited in Niitsu comprises two steps: ***first***, one or some of fluorine (F), fluoride, hydrogen (H) and carbon (C) atoms are introduced into the polysilicon; and ***second*** a thermal treatment process is performed to combine the atoms with silicon having dangling bonds existing on the crystal interface of the polysilicon to passivate the dangling bond of the silicon atom. Accordingly, it is evident the passivation method in Niitsu differs from the passivation method of amended claim 1 since Niitsu does not teach or suggest annealing using a fluorine-containing gas, a chlorine-containing gas, an oxygen-containing gas, or mixtures thereof to passivate the polysilicon layer ***in a single step***.

It is therefore Applicant's belief that even when modified in the manner described by the Examiner, Niitsu does not teach or suggest all the limitations of claim 8. For at least this reason, a *prima facie* case of obviousness cannot be established in connection with this claim. Furthermore, as it is Applicant's belief that a *prima facie* case of obviousness is not established for claim 8, the Examiner's arguments in regard to the dependent claims are considered moot and are not addressed here. Allowance of claims 8, 12 and 13 is respectfully requested.

Tran in view of Yamazaki

It is Applicant's belief that claims 3 and 10 are allowable at least by virtue of their dependency from claims 1 and 8, respectively. For this reason, the Examiner's arguments in connection with these claims are considered moot and will not be addressed here.

Substance of Examiner Interview on December 23, 2005

An Applicant-initiated interview between the undersigned and Examiner was conducted by telephone on December 23, 2005. The undersigned and the Examiner discussed the Examiner's position in relation to Niitsu that the claims as amended on July 28, 2005 were not necessarily limited to annealing using a recited gas to passivate the polysilicon layer in a single step, as argued by the Applicant in the amendment. The undersigned proposed amending the claims to add the language "in a single step" to bring this limitation into the claims and overcome the rejections. The Examiner agreed.

Conclusion

The Applicant believes that the application is now in condition for allowance and respectfully requests so.

Respectfully submitted,

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